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ABSTRACT

This study investigated how Korean adult learners of English at various levels of proficiency interpret English reflexives. The subjects consisted of 15 ninth-graders with 2.5 years of English instruction, 15 eleventh-graders with 4.5 years of instruction, 15 first-year college students with 6.5 years of instruction, and 15 graduate students who had studied in the United States for 3 or more years. Two control groups of American and Korean college students were also tested. The subjects completed a written test in which they were asked to identify the antecedent of the reflexive verb in 16 English sentences (the Korean control group took the test in Korean). The study found that as the subjects' proficiency increased, more subjects systematically bound reflexives only to local antecedents. The most advanced learners showed no performance difference from the American control group. (MDM)

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L2 ACQUISITION OF ENGLISH REFLEXIVES BY NATIVE SPEAKERS OF KOREAN

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Abstract: This study investigates how Korean adult learners of English at various levels of proficiency interpret English reflexives. The results of the experiment showed that Korean learners allowed the nonlocal antecedent about 35% of the time, which suggests that the Subset Principle does not operate in second language acquisition. However, the most advanced learners showed no performance difference from native speakers of English. This finding suggests that parameter resetting to the L2 value is possible.

I. Introduction

One of the central issues in second language acquisition research concerns the question of whether UG is still accessible to the adult L2 learner. While researchers such as White (1988) and Flynn (1987) maintain that principles and parameters of UG are available to adult L2 learners, others (Bley-Vroman, 1989; Schachter, 1988; Clahsen and Muysken, 1986) argue that this is not the case.

In order to determine which position is indeed correct, we need to investigate whether or not L2 learners have linguistic knowledge for which there is no evidence in the input data. If L2 learners attain any type of knowledge which is attributable to UG, then we have good reason to believe that UG operates in adult L2 acquisition. However, if both the L1 and the L2 show the operation of a particular principle of UG, or if the L1 and the L2 have the same value for a particular parameter, although L2 learners demonstrate knowledge of the relevant properties of the L2, there is no way of knowing whether this knowledge is attributed to the availability of UG or to transfer of L1 knowledge. Therefore, to provide strong evidence for the operation of UG in adult L2 acquisition, it is necessary to eliminate effects of the L1. White (1990) suggest the following two situations where the effects of the L1 can be eliminated (p.128):

(1) a. some principle operates in the L2 but not the L1,

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and
b. the input underdetermines the L2 grammar.

(2) a. the L1 and the L2 have different values for some parameter, and
b. the input underdetermines the L2 grammar.

(1) is concerned with the operation of principles of UG. If L2 learners demonstrate knowledge of a principle of UG which is not instantiated in their L1, this will provide support for the claim that UG is still accessible to adult L2 learners. (2) is relevant to the parameters of UG. If L2 learners, under the situation (2), acquire the proper L2 value of a parameter, this will also be evidence for the operation of UG in adult L2 acquisition.

Second language acquisition of English reflexives by native speakers of Korean meets the conditions in (2). English and Korean differ in the domain in which reflexives may be bound and it is unlikely that the binding domain of English reflexives is explicitly taught in the classroom. In addition, the fact that English is a subset of Korean with respect to the reflexive binding provides an interesting research question about the Subset Principle. We may ask if the Subset Principle argued to operate in L1 acquisition also operates in L2 acquisition.

This paper reports on an experimental study which investigates how native speakers of Korean at various levels of English proficiency interpret English reflexives. The Governing Category Parameter and the Proper Antecedent Parameter of Wexler and Manzini (1987) are studied in relation to the Subset Principle. The issue of whether UG is still available to adult second language learners is discussed on the basis of results of the experiment.

II. Binding Theory and Language Acquisition

1. The Governing Category Parameter and the Proper Antecedent Parameter. In relation to the binding theory, Wexler and Manzini (1987) propose the Governing Category Parameter (GCP) and the Proper Antecedent Parameter (PAP). Wexler and Manzini argue that since languages vary as to what counts as a governing category, the notion of governing category be parameterized as in (3):

(3) γ is the governing category for α iff γ is the minimal category that contains α and a governor for α and has
a) a subject; or

b) an INFL; or
c) a tense; or
d) a "referential" tense (=indicative mood); or
e) a "root" tense

This parameter is concerned with how far away the antecedent can be from the reflexive. In languages like English, reflexives must be bound within the same clause. However, in languages like Japanese and Korean, reflexives may take any NP as an antecedent as far as it is within the main clause. Languages like Russian treat reflexives differently depending on whether they occur in finite or nonfinite clauses. Consider the following sentence as an illustration:

(4) John thinks that [Bill wants [Tom to love himself]].

In (4), English reflexives allow only Tom to be an antecedent, Russian reflexives allow both Bill and Tom but not John as a potential antecedent, and Korean reflexives allow all three of them to be an antecedent.

Another parameter proposed by Wexler and Manzini (1987) is the Proper Antecedent Parameter. It is defined as in (5):

(5) A proper antecedent for α is
a. a subject β; or
b. any element β whatsoever.

This parameter is concerned with what types of NPs can serve as antecedents for reflexives. While languages like English allow subjects and nonsubjects to be the antecedents of reflexives, languages like Korean and Japanese allow only subjects as the antecedents of reflexives. Consider the following sentence:

(6) John showed Bill a picture of himself.

In (6) in the case of English, both John and Bill can serve as the antecedent of the reflexive. On the other hand, in Korean or Japanese, only John can be the antecedent of the reflexive.

2. The Subset Principle and the Parameters of Binding Theory. The Governing Category Parameter and the Proper Antecedent Parameter are parameters of UG which meet the Subset Condition. That is, they yield languages which fall into a subset relation. This is illustrated as follows:

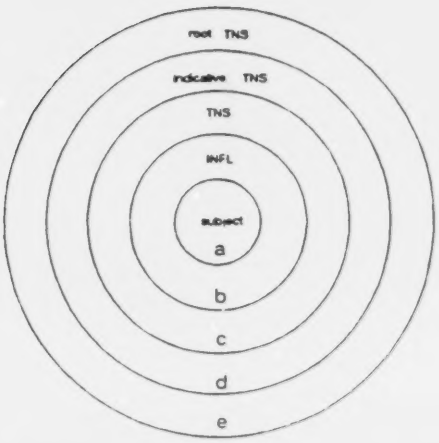

Figure 1. The governing category parameter

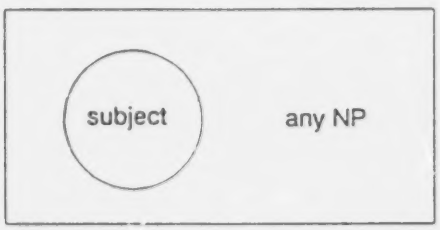

Figure 2. The proper antecedent parameter

As figure 1 indicates, the values of the GCP form a hierarchy. Languages like English which assume value (a) of the GCP are a subset of other languages which assume value (b), (c), (d) or (e) with reference to reflexive binding. Languages like Korean which assume value (e) of the GCP are a superset of other languages which assume value (a), (b), (c) or (d). Languages like Russian which assume value (c) are a subset of languages assuming value (d) or (e) but a superset of languages assuming value (a) or (b). Thus, as far as the GCP is concerned, English is one of the most restrictive languages and Korean is one of the least restrictive languages. With regard to the PAP, languages like Korean are a subset of languages like English since the latter allow any NPs as the antecedents of reflexives, whereas the former only allow subjects.

The Subset Principle states that given two languages, one of which is a subset of the other, if both are compatible with the input data, the learning function

must pick the smaller one. Considering this principle from the developmental perspective, it is predicted that in actual language acquisition process, the child would start with the most restrictive values of the GCP and the PAP, and then switch to the appropriate L1 values, if there is evidence to the contrary. In terms of Korean learners' L2 acquisition of English reflexives, assuming the operation of the Subset Principle, it is expected that Korean learners would correctly bind English reflexives within the nearest clause from the beginning. With respect to the PAP, if the Subset Principle works in L2 acquisition, Korean learners of English would only allow subjects as the antecedents of English reflexives.

III. Previous Studies

1. Finer and Broselow (1986). Finer and Broselow reported on a pilot study on the second language acquisition of English reflexives by six adult Koreans. Subjects were students in an intensive English program at a university in the USA. The experiment involved a picture identification task. Subjects were shown pairs of pictures and were given a sentence. They were then asked to indicate which of the two pictures was appropriate for the sentence they had heard or if both pictures represent the sentence. Examples of the types of the sentences used in the experiment are shown below:

(7) a. Mr. Fat thinks that Mr. Thin will paint himself.
    b. Mr. Thin asks Mr. Fat to paint himself.

Finer and Broselow's results are as in Table 1.

	Local	Nonlocal	Either
Tensed Clause	91.7	8.3	0
Infinitive Clause	58.3	37.5	4.2

Table 1. The Percentage of responses in tensed and infinitive clauses (Source: Finer and Broselow, 1986)

Table 1 shows that while subjects correctly chose the local antecedent in the tensed clauses (over 90% of the responses), they often failed to do so in the infinitive clauses. Finer and Broselow interpreted this result as indicating that subjects were assuming a value for the Governing Category Parameter which is somewhere between the (a) value (English) and the (e) value (Korean), possibly (c) (Russian). This is because the tensed/infinitival distinction is irrelevant to the

distribution and interpretation of reflexive anaphors in both Korean and English. Finer and Broselow concluded that Korean learners of English had come up with a set of binding principles that is consistent with the parameters provided by UG, but inconsistent with either the first or the second language.[1]

Finer and Broselow provided another interpretation of the results in terms of the Subset Principle. The results from the tensed clauses support the operation of the Subset Principle. However, the results from the infinitive clauses are inconsistent with the operation of the Subset Principle. To account for the differences in responses between the tensed clauses and the infinitive clauses, Finer and Broselow suggested the possibility that Korean learners of English misanalyzed the subject of the infinitive as the direct object of the matrix verb. That is, Korean-speaking learners may consider the subject of the infinitive as the direct object of the matrix verb and avoid it as the antecedent because of the Proper Antecedent Parameter (the unmarked value of the Proper Antecedent Parameter is defined to be a subject). If this is indeed the case, it can be argued that the Subset Principle fully operates in second language acquisition: the learners, assuming the most unmarked value for the Governing Category Parameter and for the Proper Antecedent Parameter, preferred the local interpretation in the tensed clauses and the nonlocal interpretation in the infinitivals.

2. Thomas (1989). Thomas investigated whether second language learners know the following facts about the interpretation of English reflexives (p. 283):

(8) a. <u>The Clause Mate Condition</u>
In a finite clause, a reflexive pronoun must find an antecedent within the minimal dominating S-node.

b. <u>The Subject Strategy</u>
A reflexive is usually identified with a subject rather than a non-subject NP in an ambiguous context.

96 second language learners of English were presented with 30 sentences like those in (9) and were required to identify the antecedent of a reflexive pronoun by circling one of three multiple-choice answers. (For example, in case of sentence (9a), a subject may choose either (a) Bill, (b) David, or (c) Either Bill or David.)

(9) a. David could see that Bill was looking at himself in the mirror.
b. Mary angrily told me that Sue had spilled a lot of paint on herself.
c. Susan gave Mary three photographs of herself taken last summer.
d. After the medical test were completed, the doctor informed Bill about himself.

Sentences like (9a) and (9b) were constructed to investigate the subjects' knowledge of the clause mate condition in a coreference neutral context and a non-local antecedent pragmatically favored context, respectively. Sentences like (9c) and (9d) were presented to see if the subject strategy holds in a neutral context and a non-subject favored context, respectively.

The results of the experiment showed that, first, second language learners as a group do not fully obey the clause mate condition, regardless of the existence of pragmatic bias; second, second language learners and native speakers of English responded similarly to sentences like (9c) and (9d) by choosing the subject NP in a coreference neutral context and the non-subject NP in a non-subject NP favored context.

To see whether second language learners transfer the rules of L1 to L2, Thomas compared responses of native speakers of Spanish (29 subjects) with those of native speakers of Chinese (24 subjects) to the test sentences. Since Spanish allows only antecedents in the same clause, whereas Chinese allows non-local antecedents, it is expected that Chinese speakers would make more mistakes than Spanish speakers. However, no difference between Spanish and Chinese speakers' responses was found with respect to the clause mate condition. That is, both groups allowed long-distance binding of reflexives. The following shows mean percentages of responses in bi-clausal finite sentences:

	Spanish L1 (n=29)	Chinese L1 (n=24)
Non-local	18.90	7.29
Local	59.48	69.04
Either	21.14	23.46

Table 2. Mean percentages of responses in bi-clausal finite sentences: coreference neutral (Source: Thomas, 1989)

Applying Wexler and Manzini's parameter-setting model of L1 acquisition to L2 acquisition, Thomas concluded that the Subset Principle does not operate in L2 acquisition, since the non-local responses are inconsistent with the subset value of the Governing Category Parameter. She also concluded that transfer of the grammar of L1 cannot account for the non-local responses of native speakers of Spanish, while this is possible for the Chinese. With respect to the Proper Antecedent Parameter, the fact that most of the subjects allowed both subject and non-subject antecedents in single clause sentences suggested that second language learners may successfully reset the Proper Antecedent Parameter to its marked value.

3. Hirakawa (1990). Hirakawa investigated how native speakers of Japanese learning English in Japan acquire syntactic properties of English reflexives and the effects of two parameters of UG, the Governing Category Parameter and the Proper Antecedent Parameter. With respect to the GCP, English represents the most unmarked value while Japanese represents the most marked one. Thus, if the Subset Principle operates in L2 acquisition, Japanese learners of English will correctly choose local antecedents in bi-clausal sentences by resetting the GCP back to its unmarked value. With reference to the PAP, if learners reset the parameter to its marked value, they will allow both subject and non-subject antecedents in single clausal sentences, since English represents the marked value in this case.

65 native speakers of Japanese in Grades 10,11,12, and 13 (ages 15 to 19 years) were tested with sentences like those in (10). Subjects were required to choose the antecedent of the reflexive in each sentence by circling one of a set of given choices.

(10) Type A: Two-clause sentence (finite)
John said that Bill hit <u>himself</u>.
Type B: Three-clause sentence (finite)
Mary remembers that June said that Alice blamed <u>herself</u>.
Type C: Two-clause sentence (infinite)
Mary asked Ann to introduce <u>herself</u>.
Type D: Three-clause sentence (infinite)
Ann knows that Mary told June not to hate <u>herself</u>.
Type E: One-clause sentence
Bob talked to Paul about <u>himself</u>.

Results showed that the Japanese learners of English could not set the value of the GCP correctly;

they set the widest value, allowing non-local antecedents for the reflexive even in tensed clauses. This could be explained in terms of transfer of the L1 value. Thus, the Subset Principle does not seem to operate in L2 acquisition. With respect to the difference between the finite and infinite clauses in responses, the finding is consistent with that of Finer and Broselow (1986). Reflexives in infinitial clauses received more non-local responses than reflexives in finite clauses, as seen in Table 3:

	Finite (Type A)	Infinite (Type C)
Non-local	17.13	36.45
Local	76.95	55.14
Either	5.92	7.79

Table 3. Mean percentages of responses in two types of clauses (Source: Hirakawa, 1990)

Finer and Broselow (1986) argue that L2 learners set the GCP to an intermediate value, allowing non-local antecedents in infinite clauses but disallowing them in finite clauses. Hirakawa's result is inconsistent with this, since her subjects made a large number of mistakes in Type A sentences.

With respect to the PAP, Hirakawa reported the similar results to those of previous studies. The Japanese learners of English correctly set the value of the PAP to the superset English value, allowing both subject and non-subject antecedents in one-clause sentences.

Although the majority of L2 learners failed to set the correct value of the GCP, some successful learners responded 100% correctly. On the basis of this, Hirakawa concluded that parameter resetting is possible, at least for some learners.

4. Summary. If the Subset Principle operates in L2 acquisition, second language learners of English should consistently choose the local antecedent of a reflexive. However, as we have seen, the results from Thomas (1989) and Hirakawa (1990) have not provided evidence for the operation of the Subset Principle in L2 acquisition.

The results of the studies also suggest that L2 learners' responses cannot be explained solely by L1 transfer. Spanish-speaking subjects in Thomas (1989) and

Korean-speaking subjects in Finer and Broselow (1986) did not treat English like Spanish and Korean, respectively.

As for the question of what value of the Governing Category Parameter L2 learners adopt, there is no agreement among studies. While Finer and Broselow's (1986) results suggest the intermediate value, the results of Thomas (1989) and Hirakawa (1990) suggest the widest value.

Another interesting question raised with reference to second language acquisition of English reflexives is whether UG is available to adult second language learners. The fact that the Subset Principle is not operative in L2 acquisition does not imply that UG is inaccessible to second language acquisition since the Subset Principle as a learning principle is independent of UG. As a matter of fact, the studies have shown that none of the subjects' responses was incompatible with a grammar of a natural language.[7]

As to whether parameter resetting is possible in second language acquisition, the studies do not provide a conclusive answer although Hirakawa (1990) suggested that "parameter resetting appears to be possible at least for some learners" (p. 81).

IV. The Experimental Hypotheses

The research hypotheses can be stated as follows:

The Governing Category Parameter

H1: Second language acquisition follows the course of first language acquisition. The Subset Principle operates in L2 acquisition, so Korean learners of English will adopt the subset L2 value immediately.

H2: The Subset Principle does not operate in L2 acquisition and the superset L1 value is transferred to the L2. Therefore, Korean learners of English will incorrectly allow long-distance antecedents.

H3: The Subset Principle does not operate and the L1 value is not transferred to the L2 either. Instead, an intermediate value is adopted as suggested by Finer and Broselow (1986). Then, the prediction is that learners will disallow the long-distance antecedent in tensed clauses but allow it in infinitival clauses.

H4: An unnatural possibility which violates UG is adopted. Learners may disallow the long-distance antecedent in infinitival clauses but allow it in

tensed clauses.

The Proper Antecedent Parameter

H1: The Subset Principle operates or L1 transfer occurs,[3] so learners will start out with the unmarked value of the PAP, allowing only subjects as the antecedents of reflexives.

H2: Korean learners will immediately notice from the positive data from English that English has the marked value of the PAP. Therefore, learners will allow nonsubjects as well as subjects as the antecedents of reflexives.

H3: An unnatural grammar which violates UG will emerge. Learners may allow only nonsubjects as the antecedents of reflexives.

V. The Experiment

1. Method. Subjects: The subjects tested in this experiment were 60 native speakers of Korean learning English, with 15 subjects in the each group. An English control group consisted of 15 native speakers of English attending University of Florida. Korean controls were 15 students who attended a college in Seoul, Korea. Background summary for each experimental group is as follows[4]:

Group 1 (n=15): this group comprised 9 female and 6 male grade 9 students aged 14 to 15. These subjects had studied English for 2 and half years at the time the test was administered. They received English lessons 4 times a week from nonnative instructors.

Group 2 (n=15): this group consisted of 7 female and 8 male grade 11 students aged from 16 to 17. These subjects had studied English for 4 and half years at the time of testing. They had English class 5 times a week from nonnative instructors. The Grammar-Translation Method was used for the purpose of helping students to prepare for the college entrance examination.

Group 3 (n=15): this group consisted of 8 female and 7 male first-year college students aged from 18 to 19. These subjects had studied English for 6 and half years at the time of testing. They had English class 5 times a week from nonnative instructors. 3 of 5 lessons were focused on reading comprehension and the other 2 lessons were focused on listening comprehension. 6 in this group of the subjects had experience with native instructors through private institutes.

Group 4 (n=15): this group consisted of 4 female and 11 male students who had studied in the USA for at least 3

years. All of them were graduate students at the University of Florida. Their ages ranged from 27 to 33. All these 15 had taken the TOEFL before first coming to the USA and scored above 550. Some of them had taken conversation courses at the University of Florida but none of them had been in the English Language Institute for intensive training.

Materials: Before the actual test, a pretest was given to students. The pretest was designed to test whether students knew the structures and vocabulary which would be used in the actual test. Students' knowledge of reflexive binding, i.e., the fact that reflexives cannot take extrasentential antecedents, was also tested. (The pretest is given in Appendix A.) Only the students who had correctly answered all the items of the pretest were included in the experimental groups. Of the high school students pretested, two third of the grade 9 students and a half of the grade 11 students failed. Of the college students pretested, only 3 failed, and none in group 4 failed in the pretest.

In the actual test, four different types of sentences were included, with 4 sentences of each type. Thus, a total 16 sentences were tested. The following presents the sentence types used in this study[5]:

(11) Type A: two-clause sentence containing a tensed embedded clause
John thinks that Tom likes himself.
Type B: two-clause sentence containing an infinitival embedded clause
John wants Tom to wash himself.
Type C: one-clause sentence
John told Tom about himself.
Type D: three-clause sentence containing an infinitival embedded clause
John thinks that Tom wants Bill to wash himself.

Types A and B sentences are relevant to the investigation of the GCP. Since the previous studies (Finer and Broselow, 1986; Hirakawa, 1990) found that reflexives in infinitival clauses had received more non-local responses than reflexives in tensed clauses, two types of sentence (A and B) were included for the purpose of comparison. Type C sentences were included to investigate the PAP. Type D sentences aimed to examine the GCP further. Finer and Broselow (1986) argued that their subjects were assuming an intermediate value of the GCP, distinguishing

between tensed and infinitival clauses. If this was indeed the case, Korean learners should not choose the subjects of matrix clauses as the antecedents of reflexives in sentences like Type D, as suggested by Hirakawa (1990).

A Korean-speaking control group received a Korean version of the test. Each test sentence was translated into Korean as naturally as possible.[6]

Procedure: The test sentences were randomized and counterbalanced and were presented in the same order. The test was administered either individually or to a class. Before administering the test, it was determined that all the subjects knew that John, Tom and Bill were male names and Susan, Mary and Alice were female names. The subjects were informed that there was no time limit. However, they were instructed to answer each item based on how they felt about each sentence, without thinking too much. They were also instructed not to change their answers once they were done. Both written and oral instructions were given in Korean (For English controls, those instructions were given in English). The subjects were asked to indicate the antecedent of the reflexive by circling one of the given choices. Consider the following examples:

(12) John thinks that Tom likes himself.
  a. John
  b. Tom
  c. either John or Tom
  d. I don't know

(13) John thinks that Tom wants Bill to wash himself.
  a. John
  b. Tom
  c. Bill
  d. either John or Tom
  e. either Tom or Bill
  f. either John or Bill
  g. either John or Tom or Bill
  h. I don't know

In (12), the (a) and (b) answer choices refer to the potential antecedent appearing first and second in the sentence, that is, NP1 (John) and NP2 (Tom), respectively. The third answer, either NP1 and NP2, refers to the ambiguous interpretation of the sentence. For the case where the subject cannot decide the appropriate antecedent of the reflexive, "I don't know" answer was included as the fourth choice. In (13), in addition to the NP1 (John), NP2 (Tom) and NP3 (Bill), all

the possible combinations of these three potential antecedents were given.

2. Results. Performance of control groups: Table 4 shows overall responses from the English control group and the Korean control group:

		English (n=15)	Korean (n=15)
Type A	NP1	0 (0.00%)	29 (48.33%)
	NP2	60 (100.00%)	19 (31.67%)
	NP1/2	0 (0.00%)	12 (20.00%)
Type B	NP1	1 (1.67%)	25 (41.67%)
	NP2	59 (98.33%)	18 (30.00%)
	NP1/2	0 (0.00%)	17 (28.33%)
Type C	NP1	41 (68.33%)	55 (91.67%)
	NP2	13 (21.67%)	0 (0.00%)
	NP1/2	6 (10.00%)	5 (8.33%)
Type D	NP1	0 (0.00%)	5 (8.33%)
	NP2	0 (0.00%)	30 (50.00%)
	NP3	60 (100.00%)	14 (23.33%)
	NP1/2	0 (0.00%)	1 (1.67%)
	NP1/3	0 (0.00%)	0 (0.00%)
	NP2/3	0 (0.00%)	9 (15.00%)
	NP1/2/3	0 (0.00%)	1 (1.67%)

Table 4. Responses from the control groups

As expected, the English control group performed nearly perfectly with respect to the GCP. Regarding the PAP, native speakers of English allowed nonsubject as well as subject as antecedents of reflexives, with preference of subject to nonsubject antecedents, 68% to 22%. This is in contrast with the responses from the Korean control group. None of the Korean controls chose nonsubject antecedents for reflexives. With respect to the GCP, while native speakers of Korean showed all three types of responses (i.e., "NP1", "NP2", or "either NP1 or NP2") as expected, long-distance antecedents were most preferred.

Overall performance of experimental groups: Table 5 displays the number and the percentage of responses given by four experimental groups to four different types of sentences. Table 5 shows that all groups performed quite well across four types of sentences. With respect to Types A, B and D sentences, which are of relevance to the investigation of the GCP, the most frequent response

		Group 1 Number	(n= 15) %	Group 2 Number	(n= 15) %	Group 3 Number	(n= 15) %	Group 4 Number	(n= 15) %	Total Number	(n= 60) %
Type A	NP1	25	41.67	19	31.67	18	30.00	6	10.00	68	28.33
	NP2	31	51.67	34	56.67	41	68.33	54	90.00	160	66.67
	NP1/2	2	3.33	1	1.67	1	1.67	0	0.00	4	1.67
	Dont' know	2	3.33	6	10.00	0	0.00	0	0.00	8	3.33
	Total	60		60		60		60		240	
Type B	NP1	18	30.00	18	30.00	12	20.00	5	8.33	53	22.08
	NP2	39	65.00	34	56.67	45	75.00	55	91.67	173	72.08
	NP1/2	2	3.33	0	0.00	2	3.33	0	0.00	4	1.67
	Dont' know	1	1.67	8	13.33	1	1.67	0	0.00	10	4.17
	Total	60		60		60		60		240	
Type C	NP1	48	80.00	43	71.67	49	81.67	54	90.00	194	80.83
	NP2	9	15.00	9	15.00	8	13.33	5	8.33	31	12.92
	NP1/2	2	3.33	1	1.67	2	3.33	1	1.67	6	2.50
	Dont' know	1	1.67	7	11.67	1	1.67	0	0.00	9	3.75
	Total	60		60		60		60		240	
Type D	NP1	4	6.67	1	1.67	4	6.67	0	0.00	9	3.75
	NP2	12	20.00	19	31.67	10	16.67	5	8.33	46	19.17
	NP3	34	56.67	35	58.33	38	63.33	55	91.67	162	67.50
	NP1/2	3	5.00	2	3.33	0	0.00	0	0.00	5	2.08
	NP1/3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	NP2/3	5	8.33	0	0.00	5	8.33	0	0.00	10	4.17
	NP1/2/3	1	1.67	2	3.33	3	5.00	0	0.00	6	2.50
	Don't know	1	1.67	1	1.67	0	0.00	0	0.00	2	0.83
	Total	60		60		60		60		240	

Table 5. The number and percentage of responses by experimental groups

was the local interpretation of the reflexives. Korean learners of English as a whole chose the local antecedent more than 65% of the time (66.67%, 72.08%, 67.50% for Types A, B and D, respectively). However, the long-distance antecedent was also chosen more than 20% of the time (28.33%, 22.08%, 22.92% for Types A, B and D, respectively), which means that the subjects, all together, had not yet acquired the behavior of English reflexives. (The analysis of individual subjects' responses revealed that this response pattern was consistent across subjects, with the exception of Group 4 subjects. While none of the subjects from Groups 1, 2 and 3 responded perfectly to types A, B and D sentences, 7 out of 15 subjects from Group 4 showed 100% correct responses to these sentences.) The "either NP1 or NP2" or "either NP1 or NP2 or NP3" responses were quite rare. The subjects tended not to judge the sentences to be ambiguous. The fact that the subjects showed nonlocal responses about 35% of the time suggests that the Subset Principle does not operate in L2 acquisition, since the Subset Principle predicts that subjects will only choose local antecedents for the reflexive. With respect to the PAP, the subjects correctly allowed nonsubjects as well as subjects as the antecedents of reflexives. This result indicates that the subjects had already reset the PAP to the marked value.

In order to determine whether there are significant differences in performance across groups and sentence types, two-way analysis of variance was done. Results of the ANOVA indicated a significant group effect ($F(3,56)=14.71$, $p<.001$) but no significant effect of sentence types ($F(2,112)=1.29$, $p=.279$) or interaction between groups and sentence types ($F(6,112)=.60$, $p=.729$). To refine the analysis, the data were further analyzed. Tukey's procedure revealed that Groups 1, 2 and 3 are significantly different from Group 4 ($p<.05$). Between Groups 1 and 2, 1 and 3, 2 and 3, no significant difference was found.

Performance of individual subjects: Thomas (1991) and Eckman (1993) argue that in order to determine whether L2 learners' grammars are constrained by UG, individual subjects' patterns of response should be investigated. Therefore, I present the number of subjects within each group who systematically bound reflexives to the indicated antecedent(s). In Table 6, 'systematicity' is defined as 3 or 4 identical responses to the 4 tokens of each sentence type.

Table 6 indicates that as subjects' proficiency

	G1 (n=15)	G2 (n=15)	G3 (n=15)	G4 (n=15)
Type A				
NP1	1	3	1	0
NP2	4	7	11	14
NP1/2	0	0	0	0
Type B				
NP1	1	1	1	0
NP2	8	4	11	14
NP1/2	0	0	0	0
Type C				
NP1	13	11	13	15
NP2	0	0	0	0
NP1/2	0	0	0	0
Type D				
NP1	0	0	1	0
NP2	0	1	0	0
NP3	7	6	9	14
NP1/2	0	0	0	0
NP1/3	0	0	0	0
NP2/3	0	0	1	0
NP1/2/3	0	0	0	0

Table 6. The number of subjects within each group who systematically bound reflexives to the indicated antecedent(s)

level increased, more subjects systematically bound reflexives only to local antecedents. In the case of Type C sentences, most subjects systematically bound reflexives only to subject NPs. The fact that only 1 out of 60 subjects systematically allowed ambiguous interpretations of reflexives (in Type D sentences) suggests that subjects habitually prefer one interpretation over the other(s).

Thomas (1991) and Eckman (1993) suggest that the response pattern which allows long-distance binding while disallowing local binding is not admitted by Wexler and Manzini's GCP. However, if we consider that native-speaker controls as well as L2 learners tend to avoid ambiguous interpretations, some subjects' responses allowing only long-distance binding can be explained as their preference for long-distance antecedents. Since long-distance antecedents are preferred to local antecedents in Korean, some subjects' systematic

preference for long-distance binding may be due to L1 interference. The fact that 14 out of 15 subjects from group 4 systematically allowed only local binding, despite the preference for long-distance antecedents in Korean, suggests that these learners had already acquired the behavior of English reflexives.[7]

Performance on the governing category parameter: The results from the experimental groups showed that the subjects did not perform differently with respect to the Types A and B. This result was rather unexpected, since the previous studies found the difference in choice of local antecedents between sentences involving tensed embedded clauses and those involving infinitival embedded clauses. The results from Type D sentences confirmed no performance difference between tensed and infinitival clauses. The subjects correctly chose the local antecedent 67% and 68% of the time on Type A sentences and Type D sentences, respectively. Because no significant difference between three types of sentences was obtained, it was decided that the results from Types A, B and D were taken together. Table 7 displays the mean number and percentage of correct responses from each experimental group. Since total 12 sentences related to the GCP were included in the test, a perfect score is 12.

	Group 1	Group 2	Group 3	Group 4
Score	6.93 (57.75%)	6.87 (57.25%)	8.27 (68.92%)	10.93 (91.08%)

Table 7. Mean number and percentage of correct responses (by group)

Table 7 suggests that number of years of English study has an effect on the subjects' ability to correctly identify the antecedents of reflexives. Figure 3 displays the relationship between performance on the test and years of English study. As figure 3 indicates, there exists a positive relationship between years of English study and test score, with the exception of Group 2.

However, the fact that the Group 4 performed significantly better than the Groups 1, 2 and 3 suggests that the performance differences among four groups might be attributed to the amount of natural linguistic input each group had received. Group 4 had received lots of natural L2 input and had experience using English in communicative situations. In contrast, Groups 1 and 2 had

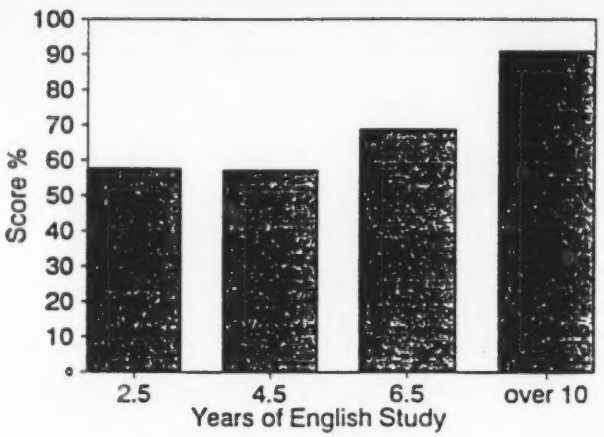

Figure 3. Relationship of score to number of years of English study

received no English training from native instructors and they had been exposed to English only in formal classroom settings. Most of the class time in these two groups were devoted to grammar instruction and translation. Group 3 also had had English training in formal classroom settings, but listening comprehension was an important part of English lessons and some of group 3 subjects had had experience with native instructors (by taking English conversation courses).

In order to determine whether there is a significant difference in performance between Group 4 and the English controp group, analysis of variance was done. The result showed no significant difference between two groups ($F(1,28)=5.55$, $p<.05$). Mean percentage of correct responses given by Group 4 and the English control group to Types A, B and D sentences is 91.08 and 99.44, respectively.

Performance on the proper antecedent parameter: The results from Type C sentences showed that Korean learners had already reset the PAP to its L2 value. Even the youngest group of the experimental groups correctly allowed nonsubjects as well as subjects as the antecedents of reflexives. Since only subjects are allowed to be the antecedents of reflexives in Korean, my subjects could not transfer the L1 value of the PAP to L2. This result raises questions about Finer and Broselow's (1986) interpretation that Korean L2 learners seemed to analyze the subject of the infinitive as the direct object of the matrix verb and to avoid it as the

antecedent of the reflexive because of the PAP. According to Finer and Broselow, Korean L2 learners might assume the unmarked value of the PAP because of the operation of the Subset Principle and this might affect learners' performance on Type B sentences. However, the results from Type C sentences shows that Korean learners were not assuming the unmarked value of the PAP.

Although either subjects or nonsubjects are allowed as the antecedents of reflexives, Korean learners preferred subject to nonsubject antecedents (81% to 13%) as did English controls. However, L2 learners' response pattern did not replicate that of English controls. In fact, there was a significant difference between Korean learners and English controls (χ^2=9.916, p<.01). The results for individual sentences revealed that Korean learners and English controls had not responded similarly to some sentences. For example, in the following sentence, where English controls chose the nonsubject antecedent almost exclusively, Korean learners most frequently chose the subject antecedent:

(14) Susan asked Mary about herself.
NP1 NP2

	G1 (n=15)	G2 (n=15)	G3 (n=15)	G4 (n=15)	Control (n=15)
NP1	8	6	10	10	0
NP2	6	6	4	4	13
NP1/2	1	0	0	1	2
Don't know	0	3	1	0	0

Table 8. The number of responses to (14) by groups

Zobl (1989) argued that L2 learners show differential sensitivity to input properties: while L2 learners are sensitive to abstract properties of the L2 syntax, they are not very sensitive to discourse-pragmatic properties of the L2. The results from Type C sentences are consistent with this claim. While Korean learners reset the PAP to its L2 value, they do not seem to have semantic or pragmatic knowledge that native speakers of English have. For example, when Korean learners encounter sentences like (14), most of them, even the most advanced learners, will interpret the reflexive as referring to the subject, which is inconsistent with the interpretation that most native speakers of English assume.

VI. Discussion

The results of this experiment suggest that the Subset Principle does not operate in L2 acquisition. If the Subset Principle were operating, Korean learners of English should consistently choose the local antecedents of reflexives. Since this proved not to be the case, we may conclude that the Subset Principle, a learning principle assumed to operate in L1 acquisition, does not continue to function in L2 acquisition.

The results from Types A and B sentences are inconsistent with those reported by Finer and Broselow (1986) and by Hirakawa (1990). Finer and Broselow found that there were more nonlocal responses for infinitival clauses than for tensed clauses. This finding was replicated by Hirakawa. In order to account for the differential performance on these two types of sentences, Finer and Broselow suggested that L2 learners might adopt an intermediate value of the GCP. Hirakawa also suggested that L2 learners might pass through the stage in which they assume an intermediate value of the GCP. This claim is disconfirmed in this experiment, since the subjects in the present experiment, at all levels of English proficiency, did not perform differently with respect to Types A and B sentences. To prove the hypothesis that learners move from the widest value to the narrower values as they become more proficient in English, further empirical investigation is required.

With respect to the issue of the availability of UG, the results of this experiment are consistent with White (1990)'s claim: although L1 transfer occurs initially, parameter resetting is possible, given appropriate input. The fact that the subjects from Groups 1, 2 and 3 allowed the long-distance antecedents of reflexives over 20% of the time suggests that they were transferring the superset L1 value of the GCP into their L2. However, the fact that the Group 4 subjects did not perform differently from the English controls suggest that if enough positive data from the L2 are given, it is possible to change from the superset L1 value to the subset L2 value. The ability to change from the L1 value of a parameter to the L2 value shows that UG must still be operating, since the parameter values are part of UG (White, 1989). Therefore, we may conclude that L2 acquisition as well as L1 acquisition is constrained by UG, at least in the domain tested.

VII. Implications of the Results of the Experiment for L2 Pedagogy

The results of this experiment suggest that the natural linguistic input from the L2 may be critical to parameter resetting. The most advanced group of four experimental groups successfully reset the GCP to its L2 value: the learners performed in the same way as the native speakers of English. This group had been in an English-speaking environment for at least three years, using English in communicative situations. In contrast to this group, the other three groups had not received much natural input from native English speakers and had been exposed to English only in classroom settings. Based on these observations, we may argue that a large amount of positive data from the L2 is essential for parameter resetting in the case in which the L1 has the superset value and the L2 has the subset value of a parameter.

In the case of second language acquisition, as in the case of learning English in the USA, the positive data from the L2 will be sufficient for parameter resetting, at least in the case of the GCP. Hyams (1986) argued that during the developmental process of L1, the child's perception of the input data changes: there is some perceptual mechanism that filters out the relevant input data at the early stage, but brings them to the child's attention at some later stage. As in L1 acquisition, in L2 acquisition the learner's perception of the input data may also change. As the learner's level of proficiency in English goes up by getting more positive data from English, he or she may come to attend to more subtle aspects of English. The behavior of English reflexives is one such aspect. Thus, it may be that only advanced L2 learners are able to attend to and eventually acquire the properties of Engilsh reflexives, thereby resetting the GCP to its L2 value.

In the case of foreign language acquisition, as in the case of learning English in Korea, it is hard for learners to get enough positive input from English, since they are exposed to English only in formal classroom settings. In the situations like this, negative evidence[8] may be useful. In order to inform L2 learners that certain interpretations are impossible in English, several methods can be used. In addition to explicit grammar teaching, Rutherford and Sharwood Smith (1987)'s consciousness-raising (the deliberate attempt to draw the learner's attention specifically to the formal properties of the target language), or Tomasello and Herron (1990)'s

garden-path method (whereby L2 learners are induced to make errors and then they are given corrections) may be useful. If L2 learners are not informed of the behavior of English reflexives and enough positive input is not given either, L2 learners seem to assume the superset value of the GCP and allow nonnativelike interpretations in sentences like Types A, B and D.

NOTES

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[1] The interpretation similar to this was also presented in Finer (1989), and Broselow and Finer (1991): at a certain stage of acquisition, L2 learners seem to adopt a value of the GCP that is midway between the L1 and the L2 values.

[2] More recently, Thomas (1991) and Eckman (1993) reported some cases in which interlanguage grammars do not adhere to the constraints of UG.

[3] Since Korean represents the subset value of the PAP, L1 transfer results in the same effect as the operation of the Subset Principle. In cases like this, there is no way of knowing whether learners' behavior is attributable to the operation of the Subset Principle or to L1 transfer.

[4] Those who had been exposed to English before age 12, or those who had lived abroad before age 23 were not included in the experimental groups. Those who had had experience in linguistics were also excluded. Before administering the test, it was ascertained that none of the subjects had been explicitly taught the behavior of English reflexives.

[5] English reflexives are first taught in the classroom in grade 8. Since grade 9 students do not have a large vocabulary in English, the test sentences were

designed to include only the words which had been introduced in their English class. In the same vein, structures as simple as possible were used in the test. In order to avoid monotony, negative sentences as well as affirmative sentences were included, as in Hirakawa (1990).

[6] Fifteen Korean-speaking adults who achieved an advanced level of proficiency in English were asked to translate the test sentences into Korean. The most common interpretation for each sentence was used in the Korean controls.

[7] In order to determine whether L2 learners' responses represent their preference for one interpretation over the other(s) or their underlying grammars, a new methodology must be used. That is, we need to elicit L2 learners' judgment of different interpretations of the same sentence by presenting the learner with one context and one sentence at a time.

[8] Schwartz (1987), and Schwartz and Gubala-Ryzak (1992) argue that negative evidence cannot be used in L2 acquisition. However, according to Birdsong (1989), negative evidence is necessary and useful for the disconfirmation of certain hypothesis types in L2 acquisition.

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APPENDICES

Appendix A: Pretest

I. Vocabulary

hurt	respect	believe
picture	hate	wash

II. Translation

1. John said that Tom played tennis.
2. John told Tom about the movie.
3. Susan told Mary to study English.
4. Susan wants Mary not to go swimming.
5. John thinks that Tom wants Bill to visit Mary.
6. Susan does not like Mary.

III. Reflexive-binding

In the following sentence who does <u>himself</u> refer to?

John and Tom were under the tree.
Tom was painting <u>himself</u>.
a. John B. Tom c. either John or Tom d. I don't know

Appendix B: Test Sentences

Type A: two-clause sentences containing tensed embedded clauses

a. John thinks that Tom likes himself.

b. Susan does not believe that Mary hurt herself.
c. John said that Tom washed himself.
d. Susan knows that Mary does not respect herself.

Type B: two-clause sentences containing infinitival embedded clauses
a. John wants Tom to wash himself.
b. Susan told Mary to respect herself.
c. John asked Tom not to hurt himself.
d. Susan told Mary not to hate herself.

Type C: one-clause sentences
a. John told Tom about himself.
b. Susan talked to Mary about herself.
c. John gave Tom a picture of himself.
d. Susan asked Mary about herself.

Type D: three-clause sentences containing infinitival embedded clauses
a. John thinks that Tom wants Bill to wash himself.
b. Susan believes that Mary told Alice not to hurt herself.
c. John says that Tom told Bill not to hate himself.
d. Susan knows that Mary wants Alice to respect herself.